

Calibration of CTBT Monitoring Stations for Event Identification: MDT, Morocco

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The recently signed Comprehensive Test Ban Treaty provides for an international network of primary and auxiliary seismic monitoring stations to verify its compliance. To confidently use these stations to identify and discriminate between earthquakes, mine-related events and clandestine nuclear explosions requires calibration, particularly for small to moderate seismic events recorded regionally at only a few stations. Given the lack of regional recordings of underground nuclear tests in most of the world, we make use of mining and industrial explosions to test discriminants. Further complicating calibration is the short operating history of many stations combined with a lack of independent information ("ground truth") on the seismic sources. Here we describe a procedure for calibrating such stations and apply it to the CTBT auxiliary station MDT in Morocco. Data is available for three months in 1990 when MDT was operated as part of MEDNET. An event detector was run over the continuous data and regional events identified and roughly located using S-P time and back azimuth. The procedure uses spatial and temporal clustering to identify "known" mine blasts. The spatial clustering is done using the waveform correlation technique of Harris (1991) to find events with similar sources and locations. Temporal clustering looks at the time of day and day of the week of events with the mine blasts occurring during working hours and days. A set of "known" earthquakes is also determined using location, time of day and size criteria. With these independent libraries of "known" seismic events we evaluate promising regional discriminants such as high frequency P/L_g . We also examine distance and path effects on the discriminants. Preliminary results indicate high frequency P/L_g provides some separation between mine blasts and earthquakes.

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